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EARLY STRIKING OF MONOLITHIC REINFORCED CONCRETE SLAB STRUCTURES AND ITS DANGERS

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Artificial intelligence and future society II

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Abstract

Significant changes over the last decade have been made possible by the continued evolution of technical solutions and the fact that computing capabilities that were not yet available were becoming more accessible to everyone. Initially, the research focused on processing big data, pointing out that huge amounts of data could not be effectively handled and processed by our previous solutions. The strategy for developing artificial intelligence has now undergone a major transformation. This article intends to present this transformation and a slice of the results already achieved.

Keywords: Artificial Intelligence, Artificial Intelligence Strategy, Artificial Intelligence Applications

Introduction

This article reviews the basic concepts of Artificial Intelligence (AI) strategies. The starting point is the general definition of a strategy. A strategy is a long-term plan of action to achieve a certain goal, which is often to solve a so-called "win" or a problem. It needs to be distinguished from immediate action, since the strategy needs to be carefully planned in time to provide the actions and the resources needed to implement them. The word was originally used in warfare, meaning the art of winning the war, moving and supplying armies.[1]

The concept of strategy in our days

Today, this term has a much broader meaning. In the 20th century, three levels of strategy were distinguished:

- total, national, integrated strategy;
- general strategy (diplomatic, military, economic);
- operational strategy, setting out specific war objectives.

In this article, of course, we do not use this interpretation, but the approach taken in the transposed sense. In this way, we can interpret business, economic, marketing, trading, technology and corporate strategies, and include the concept of artificial intelligence strategy in this line. The concept of AI strategy can perhaps be better formulated if we say that AI strategy is a unique combination of principles, methods, technologies, the application of which, as far as possible, enables the realization of an imagined future.

Strategic program for artificial intelligence

Developing AI can raise a number of potential issues, the cost of which needs to be considered already during strategic planning. What are the key questions to answer:

- What areas should the development focus on? (Priorities)
- What is the appropriate ratio for AI development in terms of commercial and government funding?
- How do legislative decisions influence AI developments?
- What changes may be needed in the area of auditing?

[1] Its shape comes from the Greek strategic word.

• What ethical considerations should be considered (and balanced) in AI development and autonomous systems?

• What specific legislative or regulatory changes are needed for AI applications?

The first and most important message of the strategies to be released must be that the use of AI cannot be an end in itself; To this end, a number of initiatives should be identified to integrate AI rapidly, iteratively, and responsibly into decision-making and to help enhance research in priority areas. Correspondingly, we can determine what specific tasks these initiatives involve and which key platforms can be implemented. These may include sharing data on a common basis, creating reusable tools, clarifying standards, and regulating access to cloud and broadband services. In parallel, they can define steps to prepare the processes for AI applications through digitalization and intelligent automation. It is also a strategic issue that universities, industry and international collaborators cannot be excluded from implementation. The strategy generally requires consultations with university leaders, the private sector and the international community for AI ethics and AI security. It is advisable to clearly identify the strategic center of the AI and clarify responsibilities.

Possible areas of application of the strategies

The strategies issued must address implementation issues in detail. Within this, the key missions that need to be addressed in implementing AI-enabled functions should be addressed as a matter of priority. These can span a wide area of society, so let's look at the strategy to identify possible areas for AI applications:

• Improve situational awareness and decision making. This includes AI applications that are capable of providing position information to managers (eg image analysis), thereby helping them to choose the optimal course of action, ie decision making.

• Increasing the safety of actuators. Essentially, it should be possible to use artificial intelligence to enhance the ability to perform, for example, in difficult situations. the safety of aircraft, ships and other vehicles by sending AI alerts to operators.

• Implementing predictive maintenance and care. AI can be used to predict critical component failure, automate diagnostics and plan maintenance based on the state of the data and equipment.

• Simplification of implementation. AI will be used to reduce the time spent on manual, repetitive and frequent tasks. By enabling automated task monitoring, AI is able to reduce errors and costs, increase performance and agility, and promote resource allocation to higher value activities.

After clarifying the principles, the strategy should also address implementation issues. The starting point is to face global challenges in that the challenges include research, coordination of activities. The specific activities listed can be interpreted as action plans.

Basic principles for the developments of artificial intelligence

So let's look at the principles we can follow in artificial intelligence development:

• Global Approach: Addressing the major global challenges facing society as a whole (humanitarian aid, forest fires, hurricanes, earthquakes, disasters) by developing artificial AI missions through artificial intelligence. These open missions pose a challenge to a broad community and, together with universities and industry, can also contribute to key missions.

• Strengthen academic partnerships and spread new MI innovation districts. The strategy calls for longer-term, stable funding for universities to attract the best scientists to long-term research in critical areas and to continue to educate the next generation of talented researchers in AI development. This includes supporting relevant long-term discoveries.

• Strengthening partnerships with industry. The strategy should also address the fact that engaging and strengthening the AI technology ecosystem requires them to experiment with a number of partnership models. These include bold new AI initiatives with large industry partners, small start-ups and venture capital companies. In addition, steps are being taken to make it easier for AI community members to participate in processes such as accelerating critical partnership processes and lower administrative burdens. They can create a centralized AI portal for potential partners detailing key processes, topics of interest and relationships to simplify contracts, procurement and on-board processes.

• Developing international alliances and partnerships. An extended network of mutually beneficial alliances and partnerships can be a lasting tool to overcome global AI challenges. Foreign Allies and Partners offer perspectives and talents that can be created through deeper interoperability and trust through participant exchange, combined portfolio design, and collaborative AI development and deployment.

• Connect with the open source community. The open source community is a vibrant global incubator of talented individuals and transformational ideas. We add our data, challenges, research and technologies to this community and work with the open source ecosystem as a tool to attract talent, identify and develop new AI technologies that transform new technologies, and expand our

available technology base. This area, of course, generates a number of security issues that will need to be addressed in a separate section of the strategy.

• Another critical security area is data management. Many analysts believe that a reform of AI data management policies may be needed. Big data collectors store significant amounts of data to build many AI systems, and government data is also particularly important in developing AI applications. However, some analysts have observed that much of this data is either classified, unavailable or otherwise protected for privacy reasons. These analysts argue that the government should implement a new privacy policy that balances data protection between "official" data and "private" data and aligns it with the need to develop AI. This is also important because AI algorithms are sensitive to distortion, theft and manipulation, especially when the available data set is not properly handled (stored, protected, etc.).

Other challenges for researchers in human-machine interaction include the following:

• Goal alignment. Man and machine must understand the purpose. As systems meet in a dynamic environment, goals change, and humans and machines need to adjust at the same time based on a shared view of the current environment.

• Task adjustment. People and machines need to understand the boundaries of each other's decision areas, especially when goals change. In this process, people need to be aware of the design limitations of the machine to prevent inadequate trust in the system.

• Human Machine Interface. Because of the need to make many AI applications in a timely fashion, traditional machine interfaces can slow performance, but humans and machines need to coordinate trust in real-world ways.

Artificial intelligence applications

In this section, let's look at some of the already existing AI applications that can help meet social needs and be useful to us, so they can be part of the strategies we are developing.

Pollution

There is no question that polluting, uncontrolled industrial activity, changes in transport, heating and weather can be troublesome, but that it is important at the same time to support interventions and short-term solutions to mitigate adverse effects, taking longer-term, more complex regulatory or cultural steps to eliminate or modify its causes, which must be preceded by a change of approach. Artificial intelligence solutions to support air pollution in big cities in China aim to achieve

these short-term goals with a forecasting system that, with its huge amount of data and computing power, identifies the imminent problem, and suggests periodic closure, or traffic reduction).

Transport

The next example of the application of artificial intelligence is from China. In Hangzhou, ambulances are aligned with ambulances, so they automatically give free ambulances. By using this method, Alibaba's "City Brain" AI IT platform was able to halve ambulance deployment times in the East China metropolis. However, free passage for ambulances at intersections is only one of many benefits of using an AI based traffic management system. The City Brain AI platform manages city traffic based on continuous real-time traffic and weather data. On the 128 junctions it manages, the speed of vehicle traffic has increased by 15.3 percent over the past year. In addition to traffic management, AI platform interventions will be extended to the city's energy and water supply in the future. Along with Hangzhou, a similar AI platform already manages the traffic of Suzhou and Suzhou in China. The fact that the system has already been deployed in Kuala Lumpur, Malaysia, marks the success of the application.

Researchers at the Georgia Georgia Institute of Technology and Multiscale Systems, Inc.[2], have found that hackers attacking Internet-connected and interconnected cars can disrupt traffic and cause chaotic traffic chaos in big cities. Physicists ran a 2026 Manhattan simulation[3] and found that if 20 percent of vehicles were randomly stopped in rush hours (the probability is low), all traffic would stop. However, if hackers attack 10 percent of the vehicles at the same time of the day, vehicles from the ambulance, fire brigade, and police will be unable to reach their destination because other immobilized cars cannot physically give priority to them. Outside the rush hour, 20 percent of the vehicles being attacked at other times of the day are in the same situation. A possible solution is to fragment the digital network that affects vehicles, which makes it much harder for too many cars to connect to the same network, making their attack more complicated. The conclusion is obviously that the number one problem is that all cars run on a single central computer system. Of course, the researchers did not want to cause panic or make car occupants become pedestrians, which could further block the streets or cause accidents. The researchers also emphasize that they are not cybersecurity experts and did not want to probe a hacker attack, they just wanted security experts to get a predictable picture of the size of a hacker attack that could disrupt urban traffic.

[2] Georgia Tech
[3] Researchers chose Manhattan for their simulations because of the large amount of data available on the city's traffic patterns.

MIT researchers have been working with the AMS Institute[4] for years to bring autonomous boats to the Dutch metropolis. In 2016, a prototype of rectangular hulls equipped with sensors, microcontrollers, GPS modules, cameras and other hardware was tested in a project called Roboat. (The project is led by MIT professors Carlo Ratti, Daniela Rus, Dennis Frenchman and Andrew Whittle.) The boat followed a pre-programmed route on one of the canals, moving both forward and backward. Researchers last year printed a machine that was shrunk to a quarter of its original version and was powered by an advanced path-tracking algorithm (3D-printing), which proved to be more efficient and better than its predecessors. In June, a safety interlock mechanism to regulate the interconnection of boats to prevent them from falling was developed. The solution means that these craft can already be used as a group, as a swarm. According to the latest communication, they are now capable of deformation. The algorithm allows machines to start moving in a given configuration, to separate, to hold on to the other, and then to reassemble in a new configuration. In simulations, groups of robot units evolved from straight lines to triangles, quadrilaterals, and other formations. Each transformation took only minutes. The system is scheduled to be tested in 2020. The world's first autonomous boat bridge will cross a 60-meter canal.

Health

Researchers have developed a new audio system that allows visually impaired people to access web content from smart speakers and similar devices as quickly and effortlessly as possible. The development was led by a PhD student at Waterloo Cheriton[5] and was a research assistant professor at the University of University[6] and a researcher at Microsoft Research. Researchers have developed a voice system to help the blind and partially sighted to access web content as quickly and efficiently as possible. The assistant was invented for smart speakers and similar devices. “When interacting with computer systems, visually impaired people often rely on screen readers and increasingly on voice-based virtual assistants. Virtual assistants are convenient and accessible, but they are not deeply connected to the content, they usually read only the first few sentences of an article, they do not make alternative search lists, they have no suggestions, ”explains Alexandra (Sasha) Vtyurina . The reason for the research was that virtual assistants are convenient and accessible, but they are not able to deal with the content in depth. Unlike virtual assistants, screen readers go deep into accessible content, refine navigation, and help, but they are often not sufficiently ergonomic to use. he is in trouble. The

[4] Amsterdam Institute for Advanced Metropolitan Solutions
[5] University of Waterloo Montreal
[6] Washington University (Seattle)

new device integrates the best of both technologies. The sound is the number one input, the user "next", "previous", "go back", "go forward" and so on. give instructions. The prototype is called VERSE (Voice Exploration, Retrieval, and Search) and can be associated with "smartphone" or smart watch applications. Input acceleration performs a function similar to keyboard shortcuts, such as turning the top of the "smart watch" to jump to the next search result, and so on. VERSE is similar to other virtual assistants in that it provides voice-based answers to user questions. In the next step, however, it functions differently. If a user needs more information, VERSE can access other search verticals, such as news, facts, and related searches, and visit any article that appears as a search result.

It is estimated that there are more than 250 million visually impaired people in the world (World Health Organization) and 50 million sticks. It has never been innovated since the use of the white bot, and visually impaired individuals have encountered problems such as avoiding obstacles at eye level. To protect people from low-hanging objects and obstructions above the chest level, the WeWalk intelligent bot with ultrasonic sensors warns users of nearby obstacles by vibrating the handle.

The bot can be paired with a smartphone's Bluetooth system for easy control. Because it is integrated with Voice Assistant and Google Maps, you can use built-in speakers to inform users about nearby stores and infrastructure details that they may not be able to see.

Law enforcement

The ability of governments and law enforcement agencies to monitor the public through face recognition was once the domain of science fiction. But modern technology is increasingly bringing these scenarios to life. A recent investigation found that US law enforcement agencies use departmental records to identify individual Americans without their consent, including those without criminal records. Despite high-profile examples from fiction and reality, a research center survey found that the majority of Americans (56%) trust law enforcement agencies to use these technologies responsibly. A similar percentage of the public (59%) say law enforcement accepts facial recognition tools to assess security threats in public places.

According to the survey, it would be acceptable for the public to use these tools for purposes such as tracking people entering or leaving residential buildings (36%), controlling the presence of employees at the business location (30%) or seeing people respond. public advertising exhibitions in real time (15%). It is also telling statistics that most Americans - 86% in total - have heard at least

something about face recognition technology, and 25% said they have heard a lot about these systems. Only 13% of the audience heard nothing about face recognition.

When it comes to the question of whether facial recognition tools are used responsibly by various official organizations, the public has much greater confidence in law enforcement than in advertisers or technology companies. The majority of 56% of American adults at least trust law enforcement agencies to use face recognition technologies responsibly, with 17% indicating a high level of trust in face recognition in these agencies.

Summary, conclusions

Artificial intelligence is increasingly being disputed. It has been repeatedly proven that it can help work in many areas of society, and despite fears (eg job losses), the acceptance of AI continues to grow! In this article, we dealt with the AI strategy, which would be difficult to imagine without developing strategies. In the second part of the article the aim was to present the implementation and the results achieved. Of course, without being exhaustive, it sheds light on some of the frequencies and achievements that may continue to be decisive in shaping development directions.

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Military health screening systems

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Abstract

Health screening is an important issue for the safety of the soldier. In addition to endangering humans, screening failure can also cause combat operations to fail. Despite its importance, international organisations do not give accurate and firm instructions on health screening. The details are individually developed by the Member States. We reviewed the recommendations and detailed the methods used in the Hungarian Army. Pointed that military screening is based on civilian practice and WHO recommendations. Risk analysis is not in military health screening practice.

Keywords: military, screening, health, risk, NATO, UN, Hungarian Army

Introduction

One of the leading challenges of the 21st century, both for military medicine and civil medicine, is the exploration of protective factors that play an important role in maintaining health and preventing chronic non-infective diseases. In the course of military engagement in crisis zones, whether peacekeeping or tactical activities, the primary task of military health professionals is to identify, eliminate and fight against environmental conditions and potential health-damaging factors with the force of medicine. The importance of the question for the military doctors is that in recent years the number of peacekeeping operations involved the Hungarian Army has increased, often in extreme climatic conditions. The Hungarian Army operational engagement abroad is an average of 1,000 per year. To ensure the continued health of these soldiers, a well-organised, modern military health screening system is needed. Participation in military operations is based on a fast, well-organised, efficient health system with up to date professional knowledge. Aptitude and screening tests for the period before and after operations, and secure health care during operations, require serious systems. For human resources, preservation is in the national point of interest. The army is a highly dangerous system. When people work there, the goal is to maximize their ability to perform and maintain the health.

Principles of filtering systems

The goal is very simple. Let's just send perfectly healthy people on missions. All soldiers must be in good health and psychological condition. This expectation is a major challenge to military health care. Human being is a not fully understood biological system, so the expected result is hampered by many unknown factors. The concept of health is changing, evolving. According to the traditional approach, health is the absence of the disease. (Healthy is the one who is not sick...). At the same time, the WHO's definition of health in the "Global strategy for health for all by the year 2000" (1979) is completely contrary to its approach and philosophy, when it identified health as "full physical – mental and social well-being". This approach was new but did not help in daily practical use. Some of the parameters of "health" can be well defined and measured. The values of the lab findings in the normal range, the average of the biometric parameters, the negative results of imaging examinations, and other well-defined measurable values objectively can indicate the proper functioning of the body. The meaning of health (and its subjective perception) varies by age, culture, and many others.

We examined the screening systems for military health from the NATO, the United Nations and the Hungarian Army.

Regulation of screening systems in NATO

The highest strategic standards in the hierarchy of NATO regulators are in the AJP 4.10 (B) Allied Joint Medical Support Doctrine. The setting of expectations in the lower hierarchy levels recommended by STANAGs, regulation for member states. The pre-Deployment Medical Readiness Preparation and Baseline Assessment section of that document defines physical, dental, and mental requirements as STANAGSs, as well as immunisation requirements prior to the arrival of soldiers in the field of operations. One of the most important NATO's STANAGs is the Pre- and Postdeployment Health Assesments code 2235. The expectations for dental status are summarised in a separate document in STANAG 2466 Dental Fitness Standards for Military Personnel and the NATO Dental Fitness Classification System. It does not include detailed recommendations on the practical implementation and detailed requirements of health screening scans.

Regulation of screening systems at the UN

The system of medical fitness tests prior to participation in UN missions is regulated by the “Medical Guidelines for Peacekeeping Operations / Pre-deployment medical examinations of Uniformed Peacekeepers”, issued by the UN Health Support Department. This is regularly renewed and enforced by the department responsible for health and logistics, support for peacekeeping operations. The renewing task is carried out by senior doctors assigned to missions and performing tasks at a tactical level. A dental fitness regulations was also created to regulate pre-application medical tests. (Medical Guidelines for Peacekeeping Operations/Pre-deployment dental examinations of Uniformed Peacekeepers). These current regulators provide elements of mandatory and recommended immunisation protocols for health (clinical, imaging and lab diagnostic) tests for different mission areas. They shall also provide for a specified period of dental examinations, frequency and the form and content requirements of the related medical records.

Screening systems in the Hungarian Army

The Hungarian Army screening system is regulated by Hungarian Law No 10/2015 (VII.30). Under the rules in force, the professional and contractual examination of soldiers and candidates for voluntary reserve personnel and fitness to be tested for orbit is carried out at the MH Health Centre Defence Health Directorate in Kecskemét-based Aeromedical, Aptitude Examination and Healing Institute.

MH EK RAVGYI / Institute of Suitability

In accordance with Regulation (EC) No 10/2015 (VII.30), MH EC RAVGYI/ Aptitude Assessment Institute make the examination of military service candidates, military officer candidates, military petty officer candidates, and volunteer reserve soldiers. MH EK Institute of Aeromedical, Aptitude and Healing performs its duties under the direct direction of the MH Health Team Chief, and the healing activity under the professional direction of the Medical Director of the Central Army Hospital.

As a result of its core activities, the Institute carries out three main tasks:

- military aptitude tests,
- aeronautics medical tests,
- operation of an outpatient facility.

One of the basic conditions for the development of the army is that its staff is made up of the most capable persons in health, psychologically and physically. In keeping with this idea, the physical, chemical, psychological and biological factors that pose a health risk to all positions within the Hungarian Army systemwere assessed.

The current regulators provide the health, psychological and physical requirements associated with each position. The guiding principle is that the most important goal in the performance of all positions is to preserve health. Applying this principle, the general military fitness test may be approximated towards more ideal, job and position aptitude tests. This also reduces the risk of work-related health damage.

The military fitness test based on 3 main pillars:

- Medical fitness test
- Psychological fitness test
- Physical fitness test

A military medical fitness test examines compliance with general tasks and the medical fitness requirements for the performance of each post. The following tests will be performed to qualify of the person.

Outpatient specialist:

- Internal medicine,
- Surgical and musculoskeletal,
- Neurology and psychiatric,

- Ophthalmic
- Ear, nose, throat,
- Dental
- Additional tests if necessary,

Laboratory tests:

- clinical, serological,
- testing for HIV, hepatitis B and C virus infection,
- determination of blood type,
- EKG,
- instrumental hearing test,
- pregnancy test for women,
- sampling for drug screening in urine tests,

WHO recommendations

Historically, the WHO Directive of 1968 has been a guiding principle, which for the first time defines the recommendation of screening tests as follows.

- The disease must be an important health problem
- We need an existing cure for the disease
- Diagnostic and treatment options should be available
- The disease must have a latent stage
- There must be an effective investigation
- The test should be acceptable to the general public
- The natural course of the disease should be known
- There needs to be a rule about who should handle it
- The total cost of screening should be comparable to the costs incurred in the event of non-screening
- The discovery of cases should be considered as a process, not just a 'once and for all' project

This was complemented by the World Organisation in 2008:

- The filtering programme must respond to a need
- Screening objectives should be defined at the beginning
- The target group must be defined
- Scientific evidence shall be provided on the effectiveness of the screening programme.
- The programme should integrate education, testing, clinical services and programme management.
- There must be quality assurance with mechanisms that minimise the potential risks of screening.
- The programme shall ensure that the patient is informed, that confidentiality and respect for self-determination are respected.
- The programme should ensure fairness and access to screening for the entire target group.
- The evaluation of the programme should be planned from the outset.
- The general benefit of filtration should exceed the damage caused.

Conclusion

One of the basic conditions for the development of the army is that its staff is made up of the most capable persons in health, psychologically and physically. In accordance with this idea, physical, chemical, psychological and biological factors that pose a health hazard have been assessed for all positions within the Hungarian Army system. The current regulators provide the health, psychological and physical requirements associated with each position in this relation.

In summary, diseases that can be discovered at an acceptable cost, non-invasive or minimally invasively are recommended for screening. It is important that diseases can also be cureable and that the cost of screening must be comparable/lower than the cost of curing and treating the disease if screening is not performed. This is also generally true for widely introduced, widespread health screening programmes.

In the Hungarian Army, the tasks of health insurance are well defined and regulated, they adequately follow the needs and opportunities. Health insurance regulators are based on military foundations, they follow the logic of warfare, while civilian (WHO) traditions are the basis for appropriate testing and screening.

Civilian life is also a source of numerous dangers, and professional military service is a highly dangerous operation, with extreme workloads, serious accident injuries and/or damage to health. NATO and UN recommendations are only general, leaving it up to the members to design the parts

of screening. It would be necessary to develop a system based on risk analysis. The ideal system is customizable, modular, with multiple variables. This is the best way to reduce the health risk in the operation field.

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Diagnosis and treatment options for urinary tract stones at different ROLE levels

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Abstract

A stone attack (renal colic) on the urinary tract is a sudden, high-pain condition that immediately and significantly reduces the soldier's fighting value. In current military system we don't have the screening program for urinary stones. Because of this reason, it is necessary to prepare for the manifestation of the disease on the battlefield. In this article we review the recommended options for diagnostics and treatment at different ROLE levels in military healthcare system. We will show what to do with this illness and what is the right ROLE level to treat the different types of renal colic attack. The purpose of the diagnostic and treatment algorithm is to ensure that the soldier regains his full combat value as soon as possible.

Keywords: military, healthcare, urinary, stone, ROLE, kidney, treatment

Introduction

Because of the frequent occurrence of urinary tract stones, special attention is required. Due to its high incidence, we can certainly find one out of 20 people selected in Hungary who are symptomatic or asymptomatic.

The majority of the people having stones are asymptomatic and can only be detected by medical tests. Known many factors (e.g. heavy physical exertion, heat) and lesser-known factors that causes a sudden symptom, a hard pain, which immediately and significantly reduces the fighting value of soldiers. Preventing this has a great importance for missionary personnel. The formation of urinary stones is determined by nutritional, genetic and environmental effects. Mission conditions (increased load, altered fluid intake, climatic changes) can elevate the risk of stone appearance.

This topic has been discussed for two reasons. One, to reduce the risk by not allowing soldiers who have verifiable and detectable urinary tract stone into mission areas. Another reason is that stones can also be formed in the area of operations, the details of that are currently not well known. It is important to identify risks and prepare missionary health personnel for both prevention, diagnosis and treatment.

Appearance of renal colic

Most of urinary stones are asymptomatic. The patient does not feel anything from the disease, stones do not constitute a barrier to the flow of urine in that cases. Under the influence of external or internal factors (movement, load, change of air pressure, shock-like fluid intake), stones that have so far adhered to the mucous membrane of the renal collecting system, due to their crystal structure, can start to move ahead, jamming the urine flow from the kidney. The reaction of the urinary tract is always the same: smooth-muscle spasm. Visceral smooth-muscle spasm occurs suddenly and is accompanied by great pain, this condition called a kidney stone attack.

Pain can appear in a costovertebral corner, front in the abdomen, under the rib arch, in the lower abdomen depending on the location of the stone. Pain along the kidney-pipe (ureter) line can radiate to the testicles in men or, in the case of women, into the large lips. Nausea, vomiting and chills are often added to the syndrome (due to increased vegetative excitement). If muscle spasm does not calm down, dehydration and reflexive decrease in bowel movement (paralytic ileus) may develop. This may mimic the image of a severe abdominal illness (abdominal disaster).

Urological diagnosis and treatment options by ROLE level

Health care is implemented progressively in healthcare facilities (ROLE 1-4). The aim is to ensure that the damage/injury or the disease is properly cared as soon as possible. Interoperability between supply facilities is possible to ensure the necessary progressivity.

Health care is divided to four levels according to the capabilities of healthcare systems (ROLE-1-4). The capabilities of the lower levels are included in the higher levels. The capabilities of each supply level can be enhanced to meet the specific requirements of the task. During care and evacuation, one or more levels can be bypassed according to the needs of the injured patient to increase efficiency.

We will review which types of urological care can be provided at different levels. From this point of view, we can discuss the options of correct support. The supply and access options for a reachable level basically define risk algorithms. Where only ROLE 1 is accessible, it is necessary to check-up the soldier sent there very thoroughly, since in case of a serious health problem we cannot provide adequate care. Conversely, in an area with ROLE 3 options, if it is needed, we can decrease the screening criteria. If a medical problem happens, adequate care is quickly accessible.

- ROLE 1

The ROLE 1 health care facility – provides primary health care, special first aid, classification, restoration and stabilisation of vital parameters, which must be permanently and easily accessible to personnel. Specialist care is not possible here due to a lack of equipment and knowledge.

Diagnostic options can be solved at the ROLE 1 level:

- physical examination
- injury identification
- suspicion of internal bleeding
- suspicion of acute stone (kidney) attack
- suspected urinary retention

Treatment options:

- verbal control (clarification, sedation)
- hemostasis
- pain relief, antispasmodic

Based on the results of clinical trials, the most effective analgesic group for acute kidney stone seizures is nonsteroidal-based anti-inflammatories (NSAIDs). With high levels of evidation, they have been shown to treat acute pain in a kidney attack well. Most commonly used active substances:

- *diclofenac*
- *indomethacin*
- *ibuprofen*

In patients treated with NSAIDs, the resistance index (RI) decreased significantly as a result of treatment, indicating the onset of urine flow beside to the stone. According to the recommendation, the first active substance to be chosen is diclofenac, this has a good chance of preventing the repeated pain after a kidney attack. Depending on the patient's condition (e.g. vomiting, nausea), the product can be used orally, intravenously (injected into the blood vessel), intramuscularly (injection into muscle) or in the form of a suppository in the rectum. The fastest way to achieve the desired blood level is by injecting intravenously, followed by injection into the muscle, rectal suppository, and then oral administration. Intravenous use of *noraminophenone* (Algopyrin) and *drotaverin* (No-Spa) is a common practice in Hungary. [87].

In case of non-transient seizures, the usage of opiate narcotic analgesics (hydromorphine hydroclorid, methamizol, pentazocine, tramadol) is also considered. When using this group of medicines, the incidence of nausea or vomiting increases, because of that should be used with antiemetics. Clinical studies with the active substance *tamsulosin* have shown that the likelihood of spontaneous stone leave increases by 29% in the lower urinary section and significantly shortens the time to departure [88].

- ROLE 2

Role 2 is a health care facility capable of receiving and classifying injured persons, restoring and stabilising vital parameters at a level higher than the previous level, as well as caring for stress patients. He routinely performs life and limb rescue surgery. It has the minimum laying capacity until the injured return to service or to a higher level of medical supply. Its ability can be extended to primary specialist surgical care, intensive therapy and the professional paramedic supervised laying capacity.

Diagnostic options (above of ROLE 1 level)

- fast track Ultrasound scan

- blood test
- urine quick test

Treatment options:

- higher levels of injury supply and bleeding control
- in addition to medication, there is no additional treatment option at this level to threat urinary stones or kidney attack

- ROLE 3

ROLE 3 is a healthcare facility — a inpatient facility installed (in the operational area) and the other elements necessary to support it. Basically (in addition to the capabilities of the ROLE 2 type care facility) it includes: surgical and primary surgical levels, intensive therapy unit, supervised laying capacity and necessary diagnostic background. Inpatient care should be suitable for intensive care of surgical cases and seriously ill and/or injured.

Diagnostic options:

- imaging scans (Doppler Ultrasound, X-ray, CT)
- advanced laboratory analysis

Treatment options

- extended surgery (e.g. kidney removal)
- high level of bleeding and wound control
- basic urine deviation (providing urinary drainage, e.g. renal catheter insertion)

- ROLE 4

Role 4 is a healthcare facility — a military hospital on the territory of the country, comprising the full spectrum of life-definite healthcare for the wounded, injured and sick patients (specialist/special surgery procedures, reconstructive surgery and rehabilitation). For this reason, it can manage the entire spectrum of urological care.

Failure of medication or repeating seizures should be considered to perform a urine diversion. This does not mean stone removal, but ensures a free flow of urine from the kidneys using an internal catheter or a tube introduced directly through the skin into the renal pelvis. In case of chills, fever,

urine diversion (deviating) should not be postponed. It is also necessary to have early use of case solitary kidney (single kidney).

Procedures for urine diversion:

- conventional uretercatheter
- double-J catheter
- transrenal drain (direct tube to the kidney, through the skin)

In case of persistent vomiting, external (paraetal) fluid and ion intake (infusion) may be required to settle the overturned ion household. In the conservative treatment of the following, the prevention of recurrence, special attention will be paid to getting sick to a good, healthy lifestyle, adherence to dietary rules, and avoiding extreme lifestyle and dietary habits. These can be modified based on the artifacts for different stone types. [85]

Summary

The vast majority of urinary stones empty spontaneously after a short or longer period of time. The probability of leaving stones less than 5 mm is 29-98% from the upper urinary tract and 71-98% from the lower urinary tract, according to literary data. For stones with a larger diameter of 5-10 mm, the same data in the upper urinary tract is 10-53% in the lower urinary tract at 25-53%. Overall, the probability of spontaneous excrastion of the urinary stones on average is calculated in the upper-middle-lower tracts: 25-45-70%. Stones can be treated with medication. Only medication treatment is available at ROLE 1-2 level. At these levels, it is necessary to estimate the chance of spontaneous stone leave for the patient. If it is low or cumulative seizures occur it is advisable to treat in a ROLE 4 level facility. At this level, it is possible to perform interventions that allows the soldier to quickly regain his fighting value. If only ROLE 3 level care is accessible, the introduction of a renal catheter can be performed, but it significantly reducing the combat value. It is also possible to treat the urinary stones non-medicated, this is available at all levels. Non-drug treatment means accelerating or facilitating the spontaneous emptying of the stone. If a spontaneous empty is likely, based on the test algorithm, this method can be obtained in combination with medication for good results. Parts of non-drug therapy:

- Abundant fluid intake (water shocks can increase seizures, but plenty of continuous fluid intake helps to empty stones)
- Movement (jumping, sports) mechanically helps to move stones through the urinary system

The purpose of the diagnostic and treatment algorithm is to ensure that the soldier recovers his full combat value as soon as possible. Adequate health insurance, through disease prevention, rapid evacuation and effective treatment of sick or injured soldiers, makes as many soldiers as possible fit for duty, plays a key role in protecting the force and maintaining their morale.

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EARLY STRIKING OF MONOLITHIC REINFORCED CONCRETE SLAB STRUCTURES AND ITS DANGERS

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Abstract

When formwork monolithic reinforced concrete structures, the most critical question is always what is the earliest period after concreting when formwork can be removed without damage (collapse) of concrete. In vertical structures, this is almost obvious, where formwork after 24 hours does not cause structural damage, but what about slab structures. The general experience is that after 4-6 days formwork can be done with subsequent supports. However, in the accelerated and increasingly competitive construction industry, according to some experts, these formwork times can be shortened to 24-48 hours. This is what the literature calls early striking. The question is how this can be achieved without loss and damage to concrete strength, without damage to formwork, as well as how much the already dangerous demolition phase endangers the safety of workers.

Keywords: accident, slab formwork, drop head, beam slab systems, early striking

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1. Introduction

For formwork of horizontal or inclined sheets, the following modern formwork systems are used in industry:

- framed formwork systems and their drop-head variants,
- timber floor formwork and variants thereof with drop heads,
- In the past year, the well-tried table formwork has come to the fore again, but with a modern design.

The fundamental difference between framed slab and wall formwork is that slab panels are always made with an aluminium frame, while this is very rare for wall structures, as aluminium has a higher modulus of elasticity, so larger deformations can occur under high concrete pressure.

Of course, the boards are much smaller than the large dimensions used for formwork, as they have to be lifted manually. The largest slab panel ever placed on the market is the 180 x 180 cm size weighing almost 40 kg. The floor panels are either hung directly on special heads on the supports or mounted on beams made of system components located between the panels. The supports are modern, nowadays usually external, trapezoidal hot-dip galvanized lofts, which are equipped with various drop pins for easy and quick formwork. Obviously, systems are more practical the fewer parts they can be assembled from, which of course can have a decisive influence on the time of formwork and formwork. The drop head design will be discussed in more detail when I analyze the task of the technical inspector for early striking.

Perhaps the most common slab formwork system in the Hungarian construction industry is the so-called timber support system [1], which consists of the support, i.e. the loft, the forkhead, the three-legged bollard, the wooden support and the covering, i.e. the shell. The supports are the same, the above-mentioned frame slab formwork supports, compatible in each other's system. The main supports of the formwork are inserted into the fork head on the supports, then the drawer holders are placed perpendicular and naturally thickened to it, and finally the formwork shells are placed on it as a cover. The drawer and main supports are made of one and the same material, so the formwork designer decides what size elements to build the system with.

Wooden supports are generally glued I supports 16 or 20 cm high with a belt width of 8 cm, or wooden supports with a truss ridge 24 cm high, regardless of manufacturing companies. Previously, the ridge design was only conceivable from glued pine, but nowadays it is not uncommon to have a wooden support with a pressed pozdorja pier or a double-ridged design for telescopic splicing. The three-legged supports, which are attached to the supports, can only be used as auxiliary structures until the formwork is completed, i.e. they only play a role in formwork and formwork. In terms of shelling, two types are usually the most common, one is the three-layer glued pine shell, which satisfies all options from 1 meter to 3 m in 50 cm rasters,

and the eternal "competitor" is plywood. Three-layer pine boards are cheaper than plywood, but their lifespan is also shorter, even despite the often visible metal edge protectors. Their surface is damaged sooner, they can't really be repaired, and after 15-20 uses, the adhesive statos peak during a lot of water absorption, i.e. swelling and drying out, and they no longer give a truly plaster-free surface. In contrast, plywood boards receive a phenol-coated, hard bakelite layer on both sides, which has a high resistance to mechanical stress, protects the sheet from strong sunlight and frost, prevents water from entering the wood layers, and in case of damage, forms a well-plastered and smooth concrete surface that can be painted or wallpapered without any special preparation. The disadvantage is that they are expensive, heavy, and are available on the market only in relatively large sizes, usually 125x250 cm.

2. The concept of the drop head.

The concept of a drop head is described below:

- Drop head used in traditional wood-based formwork, which only helps and accelerates formwork technique
- Early striking
- Facilitating drop head, with the help of which the structure can be formwork within 24-48 hours.
    - For timber floor formwork
    - For framed floor formwork

The classic drop head used in traditional timber formwork is a special fork head that accelerates the formwork process with the help of a wedge. In wood-durable systems, the formwork process begins with the relief of the slab supports. Then the thread spindle slab supports must be lowered to such an extent that the drawer supports can be toppled down. In order to tilt down wooden supports 8 cm wide and 20 cm high, the supports must be lowered by at least 3-4 centimeters. Without a drop head, this means that the trapezoidal threads have to be manually unwound together with the formwork load on them. This is a serious physical strain for workers and a time-consuming process, which means that it takes 3-5 minutes per support to unwind the spindle. For a 500 m2 slab, this means nearly 300 supports, which only takes about 1200 minutes, or 20 working hours, for the above work process. This time can be reduced to one-tenth with the drop head, which uses the built-in wedge system with a hammer blow to drop the main brackets by 4 cm and thus the drawer holders can be downloaded. After knocking down the drawer holders, formwork boards can be removed.

The drop head used for early striking in the case of timber formwork is a special head, the middle core of which supports the formwork shell immediately above it, and the wooden supports are seated in the forked part on both sides of the head. When formworking, knocking out the wedge system of the drop head, the main feeders fall by 3-4 cm, but the formwork shell in the shaft remains squeezed under the fresh concrete.

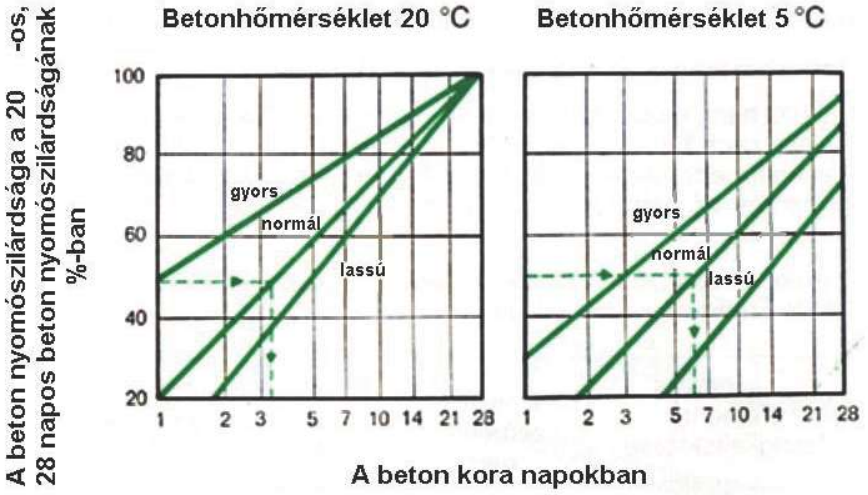
In the case of aluminium frame formwork systems [2], the solution is to install a row of drop beams in the formwork (picture 1), usually in the vicinity of torque maxima. In case of early striking, these beams continue to support the fresh concrete surface, while formwork boards hung on the beam can be lifted off using the drop fellow.

1. pucture: Slab formwork, Source: http://www.peri.hu/termekek.cfm/fuseaction/diashow/product_ID/44/currentimage/2/productcategory_ID/11/app_id/4.cfm

3. The concept of early striking in the case of slab formwork

Currently, there is no standard for when it is possible to remove the formwork of a monolithic reinforced concrete slab. [3] The expectation of the formwork floor structure is to support its own weight without harmful bends. Contrary to the popular belief among customers, formwork removal from 3-5 days does not depend on the type of formwork system, but on the quality of the concrete, the weather, i.e. the temperature, and the post-treatment of the concrete. In general, with an average daily temperature of 15 °C, the concrete formwork can be removed

after 3-5 days without risk of quality loss. [4] By this time, a raw slab made of conventional concrete reaches 50% of its compressive strength and 70% of its tensile strength *(Figure 1)*. Of course, subsequent supports may be necessary if additional loads are placed on the slab in addition to the unladen weight.



1. Figure: The relationship between concrete strength and temperature; source: https://hun.sika.com/dms/getdocument.get/20hideg%20id%C5%91ben.pdf

Formwork earlier than this, 24-48 hours after concreting, is called early striking, which is possible in case of formwork systems with drop heads. Of course, formwork is only partial here, because part of the formwork structure is formworked, 50% of the supports remain inside as individual, point-like supports, or as lineside supports with beams on top.

The main motivation for creating early striking is to shorten construction time, which can achieve significant cost savings. This means that there will be less labour input, less organisation costs, shorter crane time, and the list of economically demonstrable benefits could be listed. The question is, what are the negative consequences of early striking?

4. The dangers of early striking

The dangers of early striking can be divided into three large groups. The most important and primary issue is work and accident prevention issues [5], i.e. the safety of workers. The second major group in terms of hazards is the possible damage to the reinforced concrete slab structure to be made. The third source of investigation is possible damage to the formwork.

4.1.Accident sources of early striking.

Before analysing the hazards of early formwork, let us examine the process of formwork and formwork, its general sources of accidents. Based on the typification of the slab systems described above, it is important to treat timber support systems separately from framed, slab slab systems. The fundamental difference in formwork construction is that while the timber support system is covered from above in the plane of the beams, the framed slab formwork system is built from below, from the lower slab. [6]

4.1.1 Formwork works for timber slab formwork

The construction of wooden durable slab formwork (photo 2) begins with the erection of the main support, that the supports should still be set on the ground to roughly the desired size and placed at the end of the main support together with the forked heads attached to it, and finally, to stabilize the supports, outriggering three-legged bollards should be used, then the wooden supports can be placed between the forks of the fork heads, the intermediate slab supports must be placed according to the static requirements, the drawer supports are then distributed; from above through the mounts. The distance between the drawer supports is determined by the thickness of the slab sheet and the size of the formwork boards placed on it, it is very important to distribute the precise support, the edges of formwork boards lie only 4-4 centimeters above the drawer brackets The biggest danger of this is that when we place the formwork boards on it from above, it is no longer possible to see the lying distance of the boards. Most accidents during construction occur when the boards do not lie on the drawer holder and the worker falls on them from above. [7] This is why it is important to lay the front row precisely, which can only be done with on-site supervision control: the well-laid initial formwork board row must be fixed with nails, which already ensures the exact placement of the other boards.

2. picture: Formwork of timber slab formwork; source: http://www.ekt.bme.hu/SzerTech/Monolit_szerkezetek-2013.pdf

4.1.2 Formwork on framed floor formwork

The construction of the slab, framed slab formwork system is carried out from the bottom up. The first step is to build a pair of lofts with the help of a starting support structure. Then you need to hang aluminum signs from below on special support heads and raise them to a horizontal position with the help of a fork rod. In addition to the safety of the temporary fork bar, the other two supports must then be placed under the still free board corners. Thus, we now have a stable formboard resting on four supports, on which the new formwork boards are hung and lifted in a row, moving in both directions. The biggest source of error is missing a support. This leads to the fact that only three of the four corners of the formwork board are supported. This makes the formwork appear stable, but as soon as the worker steps on it from above, the unsupported corner tilts out and drags the worker into the depths. Therefore, after the formwork has been fully assembled, before anyone even goes on the formwork, all board connection corners from below must be checked to ensure that there is no shortage of this support. If the construction supervisor has approved this test, then the workers of the next phase, the iron fitters, can go on the formwork.

4. 1.3 Formwork of slab formwork

In the case of formwork, we do not distinguish whether the formwork structure is wood-durable [8], e or board-based, because both are obviously formwork from below. The greatest danger in both cases may be the complete collapse of the formwork. This can happen if temporary three-legged bollards used in formwork, which hold their lofts during construction, are removed during the formwork process or during the formwork process. The former case occurs when the contractor uses fewer outriggers than planned to save money and continuously moves them after wedged formwork. Other sources of danger are, of course, the fall of boards and wooden supports one by one, which can occur due to human inattention. That is why it is mandatory to use a safety helmet and work shoes with steel toe inserts when dismantling formwork.

All these dangers exist in the case of early striking, culminating in the possibility of even the most severe case, when the reinforced concrete slab breaks off with the formwork. Unfortunately, this can happen because the essence of early formwork is that the thinning of the formwork begins even before the required minimum pressure (50%) or tensile (70%) strength of the concrete is reached. If this is not preceded by a serious static inspection and simultaneous on-site inspection and strength measurement, this form of accident may occur.

4. 2. Possible damage to the floor structure as a result of premature formwork

From a static point of view, during early striking, the load-transferring formwork boards and formwork panels transfer the load of fresh concrete to the slab legs remaining as point supports, the surface of which is only a few square centimeters, which can cause significant load rearrangement. The slab can only bend between the support rows, so there is no way for the slab to develop its own load-bearing properties. Therefore, a negative torque is formed above the supports. The transformation of compressive stress into tensile stress cannot be planned and the slab is not sized for this. As a result, uncontrollable cracks form in the upper part of the slab around the remaining drop head supports, and concrete can also suffer permanent damage. To avoid this, additional top ironing could be planned. However, in the static design phase, it is hardly possible to predict what formwork system the future contractor will use, and it is definitely not possible to determine where these overloaded upper zones will be.

When determining the deadlines for the demolition of freshly concreted slabs, it is important to verify the satisfactory stability of the structure at the time of formwork demolition. In most cases, building construction should assume that this criterion is met within 3-4 days. A

simple comparison of the dimensional load and the unladen weight of the structure on the one hand, and time-dependent strength on the other, gives a satisfactory result.

4.3. Damage to formwork during early striking

Another static problem is that early striking with drop head systems leads to load accumulation, which the supports may not be suitable for. If economical floor formwork is distributed, the load on the supports shall be around 50 % of their maximum load. Any additional slab load puts safe use of the support at risk.

In order to answer these questions, I have previously carried out a measurement test with a drop head slab system in cooperation with the Építésügyi Minőségellenőrző Innovációs Rt. (ÉMI). The 18 cm reinforced concrete slabs of a four-storey condominium were formwork with a slab formwork with a drophead panel structure, so that formwork was done with the help of drop heads on average every 3 days after concreting. During the formwork of the slab on the lowest level, above the cellar, force measuring cells were placed under 3 slab supports, which were connected to a nine-channel measurement storage instrument, on which the compressive force generated in the loft could be read with an accuracy of 0.05 kN with the help of a digital display. During the measurement, the supports under the drop head remained inside under each slab, so the change of forces generated in the support of the lowest level during the concreting could be observed throughout.

The largest increase in additional support strength after formwork was observed at slab level 1 (slab above basement), which showed that after 3 days only 30% of the excess concrete surface falling on the remaining supports is still working. An increase in column strength of almost the same magnitude was measured after the preparation of the 2nd slab plate. What is interesting here is that at that time the first floor level was already 33 days old, i.e. it was beyond the age of 28 days, but it did not participate in the power play yet, transferring almost the entire burden of the slab above it to the remaining legs. When concreting the third and fourth slabs, the increase in support force was significantly less. During the control measurements carried out in the period following the formwork of the 2nd and 3rd slabs, a slight decrease in column forces (1-2 kN) was observed, which can be explained by the increase in strength of the vb. plate.

As a final result, it could be established that in the case of the drop head system, the loads of the slabs above each other, showing a decreasing trend [9], add up, so they can damage

the supporting system if the support force exhausts the load capacity of the system. How to protect yourself from this. In the case of a drop-head system, around day 3-5, the remaining ganglia must be loosened to allow creep processes to begin. In the case of modern slab supports, it is enough to hit only the grooved pins that help formwork, thereby lowering the loft by 2-3 mm, which is enough to activate the slab.

An important part of the fire protection activity is the conduct of fire investigation procedures, the results of which and especially the international experience contribute to the development of preventive and rescue fire protection by country [10, 11]. In addition to professional and municipal fire brigades, voluntary fire brigades can also be involved in fire investigation activities if they have the appropriate expertise. [12].

5. Summary

The concept of early striking usually arises primarily in connection with economic indicators, results and construction time. The common goal of both the investor and the contractor is to reduce costs and construction time. The article highlights how many additional factors have to be taken into account during the implementation of such an extra technology, in addition to economic indicators. After analysing the above-mentioned hazards, adding the additional cost of their cost and time factors to the technology, its application is far from certain. Of course, the results of such comprehensive studies cannot be generalized, they can only be applied to the specific construction site and its features.

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